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CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

A chip-level electronic package comprising: 1 1. at least one waveguide having a waveguide core. 2 The chip-level electronic package of claim 1, further comprising: 1 2. an air-gap cladding around a portion of one of the waveguide cores. 2 The chip-level electronic package of claim 2, further comprising: 3. 2 a lead; and at least one air-gap layer disposed substantially under a portion of the lead. 3 1 The chip-level electronic package of claim 2, further comprising: 4. 2 a first sacrificial layer that can be removed to form the air-gap cladding. 5. The chip-level electronic package of claim 3, further comprising: 1 a second sacrificial layer that can be removed to form at least one of the air-gap 2 3 layers. The chip-level electronic package of claim 2, further comprising: 1 6.

a coupling element adjacent to the waveguide core.



- The chip-level electronic package of claim 1, wherein the waveguide core includes at least 1 7. 2 one coupling element. The chip-level electronic package of claim 7, wherein the at least one coupling element is a 1 8. 2 volume grating coupling element. The chip-level electronic package of claim 7, further comprising: 1 9. an air-gap cladding around a portion of one of the waveguide cores. 2 The chip-level electronic package of claim 1, further comprising: 10. 2 a lead, and at least one air-gap layer disposed substantially under a portion of the lead. 3 The chip-level electronic package of claim 10, further comprising: 1 11. 2 a coupling element adjacent to the waveguide core. The chip-level electronic package of claim 1, further comprising: 1 12. a first sacrificial layer that can be removed to form an air-gap cladding. 2 The chip-level electronic package of claim 1, further comprising: 1 13.
 - 1 13. The chip-level electronic package of claim 1, further comprising:
- a second sacrificial layer that can be removed to form at least one air-gap layer.



- 1 14. The chip-level electronic package of claim 1, further comprising:
- 2 a coupling element disposed adjacent to the waveguide core.
- 1 15. The chip-level electronic package of claim 1, wherein the waveguide core is adjacent to a
- 2 lower waveguide cladding.

1	16.	A method for fabricating a chip-level electronic package comprising:
2		forming a waveguide within the wafer-level electronic package, wherein the
3		waveguide includes an air-gap cladding layer.
1	17.	The method of claim 16, further comprising:
2		(a) providing a substrate having a passivation layer disposed on the substrate;
3		(b) disposing a waveguide core on a portion of the passivation layer;
4		(c) disposing a first sacrificial layer onto at least one portion of the passivation
5		layer and the waveguide core;
6		(d) disposing an overcoat layer onto the passivation layer and the first sacrificial
7		layer; and
8		(e) removing the first sacrificial layer to define the air-gap cladding layer within
9		the overcoat layer and around a portion of the waveguide core.
1	18.	The method of claim 17, further including:
2		disposing a second sacrificial layer onto portions of the overcoat layer after (d)
3		and before (e).
1	19.	The method of claim 18, wherein (e) further includes:
2		removing the second sacrificial layer to define an air-gap layer.
1	20.	The method of claim 17, wherein (c) further includes:
2		disposing a second sacrificial layer onto portions of the passivation layer.

- 1 21. The method of claim 20, wherein (e) further includes:
- 2 removing the second sacrificial layer to define an air-gap layer.
- 1 22. The method of claim 17, further including:
- disposing a optical grating layer adjacent the waveguide core after (b) and before
- 3 (c).

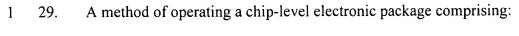
1	23.	A method for fabricating a wafer-level electronic package comprising:
2		(a) providing a substrate,
3		(b) disposing a first overcoat layer onto the substrate;
4		(c) disposing a lower cladding layer onto a portion of the overcoat layer;
5		(d) disposing a waveguide core on a portion of the lower cladding layer;
6		(e) disposing a first sacrificial layer onto at least one portion of the lower cladding
7		layer and the waveguide core;
8		(f) disposing an second overcoat layer onto the first overcoat layer and the first
9		sacrificial layer; and
10		(g) removing the first sacrificial layer to define an air-gap cladding layer within
11		the overcoat layer and around a portion of the waveguide core.
1	24.	The method of claim 23, wherein (e) further includes:
2		disposing a second sacrificial layer onto portions of the first overcoat layer.
1	25.	The method of claim 24, wherein (g) further includes:
2		removing the second sacrificial layer to define an air-gap layer.
1	26.	The method of claim 23, wherein (b) further includes:
2		disposing a second sacrificial layer onto portions of the passivation layer.





- The method of claim 26, wherein (g) further includes: 1 27.
- removing the second sacrificial layer to define an air-gap layer. 2
- The method of claim 23, further including: 28. 1
- disposing a optical grating layer adjacent the waveguide core after (d) and before 2
- (e). 3

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- coupling an optical signal to a waveguide in the wafer-level electronic package; and communicating the optical signal through the waveguide.
- 1 30. The method of claim 29, wherein the waveguide includes at least one waveguide core and an air-gap cladding around a portion of one of the waveguide cores.